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Copy 1 of 1

OCT 1963

MEMORANDUM FOR : Deputy Director (Science and Technology)

SUBJECT : Transmittal of OXCART Status Report

Attached is a current OXCART status report.

ILLEGIB

JACK C. LEDFORD
COLONEL, USAF
Assistant Director
(Special Activities)

Atts: As Stated

NRO and USAF review(s) completed.

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Attachment I to

[redacted]

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OXCART STATUS REPORT

1. Since the first flight of an OXCART A-12 aircraft, 26 April 1962, 424 flights, totaling 584:08 flight hours, have been made utilizing a total of nine aircraft at the test site [redacted] as listed on Attachment II. Of these totals, 134 flights totaling 145:37 hours were conducted with aircraft having two J-58 engines installed. The J-58 is the engine necessary for Mach number extension. The only aircraft not now using the J-58 engine is the dual-place trainer and it will eventually be retrofitted with J-58 engines. J-58 engine development status is shown on Attachment III.

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2. Eight A-12 aircraft (accounting for the loss of #123) currently are in flight test. On 4 October 1963 the tenth aircraft was delivered to [redacted] Attachment IV contains an estimated delivery schedule for the remaining five A-12 aircraft under procurement.

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3. To date the longest A-12 flight has been 3:06 hours, the highest speed achieved has been Mach 3.06, and the highest altitude has been 75,800 feet.

4. The aircraft, engines, and other critical components, including the inertial navigation system, stability augmentation system, autopilot, air induction system, pilot environment equipment, cameras [redacted] all specifically developed for the program, have performed reasonably well within the limits of testing so far in the flight test program. One of the most critical problems confronting the program is the occurrence of duct roughness which has been most severe in the Mach 2.4 - 2.8 region. Various modifications have been made to a flight test aircraft which have reduced the extent and severity of the roughness and which appear to be pinpointing airflow separation as the primary inducing factor.

25X1

5. Laboratory testing of the Inertial Navigation System (INS) was conducted during the period January 1961 - September 1961 and was demonstrating errors of less than 1 N.M./HR. After 5 hours of operation with fixes at 3 and 4.5 hours, the error was

3 N.M. compared to the specification requirement of a 4.5 N.M. error. From March 1962 - May 1962, 12 flight tests were conducted with the INS installed in a U-2. Excessive errors were being obtained due to platform misorientation. Fixes were incorporated and 9 subsequent flights of an INS installed in a U-2 were conducted from October 1962 - December 1962 with excellent results. See Attachment V for representative INS flight test results during this period. Since November 1962 there have been approximately 70 INS flights in the A-12 with the INS performance steadily improving. Attachment V shows results obtained during August 1963. The INS is presently installed in 5 A-12's and two additional systems are ready for installation.

6. Foreign object damage which has resulted in 20 J-58 engine removals and extensive aircraft nacelle modification suspended all Mach number extension flights between 5 April and 17 May 1962. Corrective measures have been taken and no further removals have occurred.

7. Corrective actions are underway for the two chronic engine problems involving excessive oil consumption and afterburner cooling liner cracking. One engine is currently under teardown investigation after an apparent accessory drive system failure sustained on 24 October; further details are unavailable at this time.

8. Aircraft #123 crashed on 24 May 1963. After intensive investigation by an accident board, it was concluded that the accident resulted from icing in the pitot tube which gave erroneous instrument readings to the pilot and led to a series of events culminating in a crash. The pilot ejected successfully. A new model pitot tube will be installed to prevent a reoccurrence.

9. Flight testing of the A-12 is now being conducted to verify the radar cross-section. The goals and status of the OXCART radar cross-section reduction program are as follows:

Original Goals	Present Status
70-90 MC - 6.0 square meters	6 square meters at low depression angles
170 MC - 1.0 square meters	3-5 square meters at low depression angles
3000 MC - 0.2 square meters	About 2.0 square meters at low depression angles

A priority flight test program is underway to determine high angle data about the ORCART vehicle so that an early assessment can be made of the 3,000 MC problem. The results of this program will determine the extent to which it may be necessary to optimize anti-radar materials used on the aircraft to minimize
25X1 [redacted] measurements will be made at a later date as soon as equipment becomes available. In addition to continuing efforts to reduce the cross-section of the A-12 through the application of certain materials used in the fabrication process, two specific projects, KEMPSTER and EMERALD, are underway to further enhance these efforts. KEMPSTER A and KEMPSTER B utilize different devices on the A-12 which will generate an electron cloud that can absorb radar frequencies. Flight testing of KEMPSTER A prototype is being scheduled in the near future. Strong emphasis is made on weight reduction of such equipments. EMERALD, a project looking to the development of a device which will generate a seeded plasma electric arc, again for absorption purposes, is currently being restudied. A decision will be made in the near future whether or not to continue the EMERALD approach. A number of studies and projects are now underway in conjunction with the Office of Scientific Intelligence looking to the development of a complete analysis of the Soviet defensive system in order to provide the best possible operational security of future reconnaissance vehicles.

10. The three A-12 camera systems, consisting of two entirely new cameras and a modified camera for the U-2 program are all in flight test. There have been a total of over 50 flights with cameras operating and results of these tests have been generally encouraging.

11. In the next few months maximum effort will be directed to further defining and eliminating the duct roughness problem and then reaching the intended speed and altitude so that the aircraft related systems, equipment and sensors can be tested under sustained high temperature and high altitude environment. Recently tests have been initiated to establish sustained time above Mach 2.0 for heat soak demonstration. Attachment VI is a summary of flight time above Mach 2.0 for aircraft #122 on five recent flights specifically designated for heat soak for which data are available. Meanwhile, seven of eventual nine operational pilots, soloed in the A-12 and are undergoing training. Bases for aerial refueling tankers are being readied and other logistical and operational preparations are underway.

ATTACHMENT II to

[redacted]

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AIRCRAFT FLIGHT TEST SUMMARY

The following is a recapitulation of flight test activity since the first flight in April 1962.

Aircraft 121 - 88 flights (total time 87:26 hours). 36 flights were with J-75 engines; 18 flights were with one J-75 engine and one J-58 engine. First flight with two J-58 engines occurred on 9 March 1963.

Aircraft 122 - 32 flights (total time 28:07 hours) with two J-58 engines.

Aircraft 123 - Crashed on 24 May 1963 after 79 flights (total time 136:10 hours) with two J-75 engines.

Aircraft 124 - (dual-seat trainer) - 157 flights (total time 242:43 hours) with two J-75 engines.

Aircraft 125 - 26 flights (total time 30:05 hours) with two J-58 engines.

Aircraft 126 - 29 flights (total time 44:40 hours) with two J-58 engines.

Aircraft 127 - 9 flights (total time 10:47 hours) with two J-58 engines.

Aircraft 128 - 1 flight (total time 0:52 hours) with two J-58 engines.

Aircraft 129 - 3 flights (total time 3:18 hours) with two J-58 engines.

Aircraft 130 - In final assembly at the operating location.

25X1

ATTACHMENT III to

[redacted]

J-58 ENGINE DEVELOPMENT SUMMARY

Total J-58 ground test hours	10,000 hours
JT11D-20 engine ground test hours	7,000 hours
Engine ground test hours above Mach 2	1,700 hours
Engine ground test hours at or above Mach 3	1,100 hours
Engine Flight Hours	320 hours

Included in the above development summary is the official 50 hour flight suitability test completed 4 January 1963. Also of interest is the completion in September 1963 of 146 hours of continuous mission cycle endurance testing on one engine. This latter test, the first in a series of informal attempts leading toward the official 150 hour engine qualification test scheduled for completion in June 1963, indicated the need for continuing development in the areas of performance and durability.

ATTACHMENT IV to

[redacted] 25X1

A-12 AIRCRAFT DELIVERY STATUS

Aircraft		Delivery to test site
121-130	OXCART	Now at site
131	[redacted]	November 12
132		December 17
133		January 15
134		February 4
135		March 17

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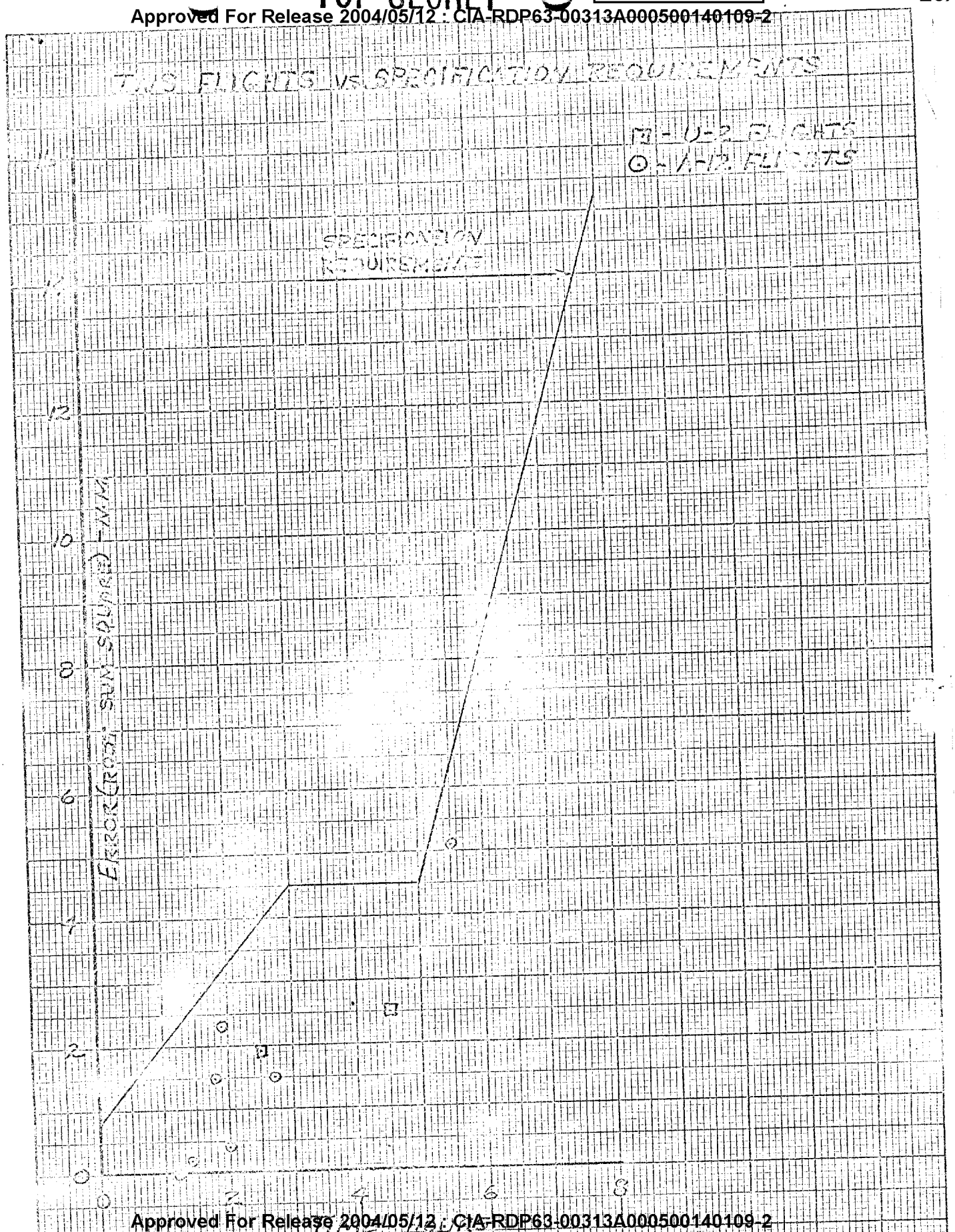

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ATTACHMENT VI to

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AIRCRAFT #122

FLIGHT TIME VERSUS MACH NUMBER

Flight Number	Time in Hours:Minutes Above Mach		
	2.0	2.2	2.4
19	:20	:10	0
20	:32	:20	0
23	:22	:17	:02
24	:39	:32	:01
25	:42	:36	:01
	2:35	1:55	:04